Wastewater Treatment Division

Appendix E:
Existing Condition Assessment

September 2002

Westin Engineering, Inc. Project 6251

Figures

1. CURRENT SYSTEMS

1.1. Introduction

The results of the Computer Systems Planning Study are documented in this Computer Systems Master Plan, which consists of:

- Executive Summary
- Master Plan
- Appendix A – Cost Saving Benefits
- Appendix B – IT Staffing
- Appendix C – IT Standards
- Appendix D – IT Architecture
- ***Appendix E – Existing Condition Assessment***
- Appendix F – Projects and Subprojects

This is Appendix E – Existing Condition Assessment. This Appendix provides an assessment of the approximately 75 information systems and associated applications within the King County Wastewater Treatment Division (WTD).

1.2. Assessment Summary

Westin Engineering, Inc. performed an assessment of the information systems within the King County Wastewater Treatment Division (WTD). The Information Systems Assessment consisted of a series of interviews with the owners and primary users of the information-processing applications used by Division staff. Approximately 75 applications were assessed and documented during the process. A few smaller systems, primarily consisting of spreadsheets, were not individually documented because they were being decommissioned, replaced, or were supporting one of the documented systems.

Westin published a WTD Information Systems Assessment document (100 pages) in March 2001, documenting each of the current systems now in use within WTD, and DNR organizations which receive support from WTD. In it, each of the assessed applications is described, its owners and maintainers are identified, technical platforms are described, inputs and outputs are identified, current plans for the application are reviewed, and unresolved issues are highlighted. The organization of the document permits the rapid updating of the information for each system as it is modified, upgraded, replaced, or decommissioned by the Division.

Assessment:

- A typical wastewater treatment organization has between 40-50 significant applications. WTD has at least 75 such applications. There are simply too many applications for an organization of this size to manage, maintain, and train staff on their usage.

- There are multiple implementations of some systems. There are too many disparate databases, with duplicate data in them, which make them very difficult to use.
- Centralized IT application oversight and coordination is missing. This has led to the proliferation of multiple system implementations and lack of data sharing between them.
- WTD's IT organization has done an excellent job of implementing an IT communications infrastructure, LAN / WAN, to support the hundreds of computers WTD conducts it's daily business on. Its robust, flexible, keeps pace with today's bandwidth needs, and provides a secure operating environment for its users.
- WTD can exchange information between all of its computer systems one way or another. The problem is that almost all of this information exchange requires human intervention to make it happen, which leads to a very significant loss of personnel productivity among the 700-800 WTD staff members. The Current System Interaction figure in section 1.3 shows this clearly, by looking for the solid black lines between system blocks. They represent automated data transfer of which there are only a few. WTD is predominately-sharing data via semi-automatic and manual means which is the heart of the problem caused by so many disparate databases.
- WTD management is very supportive of IT investments, and has tried hard to put the right technology tools in the hands of its staff. What's needed is a coordinated approach to provide these technologies to staff with an enterprise view of how they will be used, in-order to maximize data sharing and reduce duplication of information, with emphasis on ease of use.

1.3. Observations

In addition to our specific assessment of information systems that have been described in the above referenced document, a number of Division-wide observations were made. They are listed here no specific order, but are provided to give you more insight into the problems. They are a collection of comments received from over 70 system interviews and dozens of workshops which involved over 150 WTD personnel. Their concerns and observations are as follows:

- Integration of GIS is haphazard and the processes and mechanisms for integration are not widely known
- There is insufficient IT staff for the size of the supported organization
- The lack of IT staff requires each organization do its own IT development which leads to the islands of automation phenomenon
- There are multiple implementations of some systems
- There is very little centralized IT oversight and coordination
- There are multiple/fragmented finance and HR systems
- Key systems are not integrated
- Control of records is opportunistic and consequently spotty
- Access to important data is too limited
- Multiple types of personal computers complicate systems acquisition and implementation

- Some systems are at capacity
- Video records have not been added to FIRS which complicates asset tracking and management
- Policies on public access to data haven't been worked out
- Changes to systems not communicated to affected personnel
- Because of a lack of understanding of what each system does, there is the risk of multiple implementations of the same functionality
- There is no centralized list of all King County projects
- Many servers crash multiple times per day impacting productivity
- The computer or associated critical support equipment is so outdated that maintenance is not possible due to parts
- Existing software designed for a specific platform will not work on new platforms, making upgrades to new computer hardware impossible
- Many of the programs used are no longer supported and there is limited or no experienced personnel available in the market to use them
- Staff does not have the time required to keep systems running and still complete their daily assigned work.
- Users have had to develop their own work-around schemes using Microsoft Office products in an attempt to solve their own data processing problems.
- Local problems with the systems suppress attempts to develop data sharing functions with other systems.

These concerns coupled with Westin's general observations can be summarized here as follows:

- WTD personnel have come to view much of the data within the Division and the County to be "fugitive data". Fugitive data refers to information that's known to exist within an organization, but isn't used due to time and cost associated with retrieving, interpreting, and disseminating it. Fugitive data is a primary motivator for more and more redundant application development; since data can't easily be accessed, WTD staff feel the need to develop another application to gather (more like "re-gather") data and process ("re-process") that data for work and decision support.
- Over time, WTD has built up many disparate applications that solve "point" problems, such as project control and work order tracking. These islands of information use a wide variety of data storage systems, including file systems, traditional database systems, and PC storage systems (such as spreadsheets). Applications have been developed departmentally with little or no focus on Division-wide business and information management objectives.
- A typical wastewater treatment organization has between 40-50 significant applications. WTD has at least 75 such applications. There are simply too many applications for an organization of this size to manage and maintain, especially in light of staff reduction initiatives that WTD management is emphasizing.

- Applications having similar objectives and functions are being used by different workgroups throughout the Division. Integrating these islands of information will require more than simply connecting all these information sources to the County's I-NET. Connectivity isn't sufficient because the islands weren't designed to interoperate; invariably, these islands have two unfortunate properties:
  - Each island (i.e., application) has its own meaning of Division objects, such as customers, shipments, costs, equipment, facilities, etc.
  - Each island has data that overlaps with data in other islands; this partial redundancy creates a serious data integrity problem for the Division.
- The meaning of data has been skewed throughout the Division. This will be one of the most difficult issues for the Division to deal with as it implements new, strategic systems. It requires agreement on the meaning of data among people whose perspective is skewed to address their individual needs. This is understandable; staff need to get their jobs done and don't have a lot of time to confirm that their understanding of information is aligned with that of others who also use that information. In the interim, as the Division makes the transition from its current situation to new information systems, the Division will have to find ways to support different data definitions while moving toward a unified understanding of data.

1.4. Current Information System Interaction

The Current Information System Interaction Diagram, Figure E-1, is a diagram of all the information systems that were assessed., Westin published a WTD Information Systems Assessment document (100 pages) in March 2001, documenting each of the current systems now in use within WTD, and DNR organizations that are being supported by WTD. The diagram highlights several aspects of the overall assessment:

Boxes in the diagram represent individual applications. The bars along the top of each box are color-coded ***to depict the Upgrade or Replacement Priority for each specific application as follows:***

- **Red signifies Immediate Need.** The applications color-coded Red need to be upgraded or replaced within the next 12 months, if possible. For some, the replacement or upgrade process will take longer than a year, so it is imperative that the requirements definition and design process commence immediately. These are applications that are critical to the effectiveness of WTD, and there is a dire need to upgrade or replace them due to the age or to current reliability issues of these applications. Their criticality is such that the loss of any of these applications will likely result in a failure to protect wastewater system infrastructure, thereby resulting in potential catastrophic losses and damages. In addition to the impacts on facilities infrastructure, the loss of any of these applications would also severely impair WTD's ability to manage its business and prepare for the future through the implementation of new infrastructure projects necessary to fulfill current needs and position WTD for the future.
- **Yellow signifies Tactical Need.** These applications need to be upgraded or replaced within the next 1 to 3 years. They are operating fine today, but in order to extend their useful life and protect current investments in these applications they will require additional

enhancements or upgrades. They may even need to be replaced in order to protect current investment in the data and the databases that these applications work with today.

- **Green signifies Strategic Need** in the 3 to 10 year timeframe. These applications need to be upgraded, replaced, or integrated in order to position WTD for significant productivity enhancements over the long term, or to maintain downward pressure on staffing levels. Improvements to these information systems are needed in order to take into account WTD's growing facilities infrastructure and services which are already on the planning board (such as Brightwater and Denny Way).

The outside edges of each box have been color-coded to highlight which applications are receiving support ***from Information Technology professional staff within the Division or other County agency.***

- **Gray edges** indicate an application that is being supported by Division Information Technology staff. That is, WTD staff is maintaining the networks and computers, as well as associated desktop software such as Microsoft Office, only.
- **Light purple edges** indicate that the same type of maintenance – of networks, computers, and desktop productivity software – is being provided by the IT Services and Finance organizations of King County.
- **Dark purple edges** indicate support of the application by DNR's IT staffs.

The color-coded lines and arrows in the diagram depict the means by which applications share data.

- **Black lines and arrows** indicate an Automatic Data Link; data is transferred via an automatic database program.
- **Light blue signifies** Import/Export, FTP Data Link. This is a data link that does require human intervention, either the elicitation of an import or export routine or by placing a data file within an FTP site.
- **Green lines and arrows** indicate Manual Data Link. These data links require even more human intervention. These manual data links are carried out either by hand-carrying a floppy disk to another computer (i.e., "sneaker net") or by attaching a file to an email message. In either case, the data must first be "manually" loaded onto the transfer medium and then "manually" unloaded into the receiving application. The data could also be printed off from one application and then "manually" re-entered into another application.
- **Red** indicates a Planned Data Link, a data link that WTD plans to implement as an automated link using a database program.

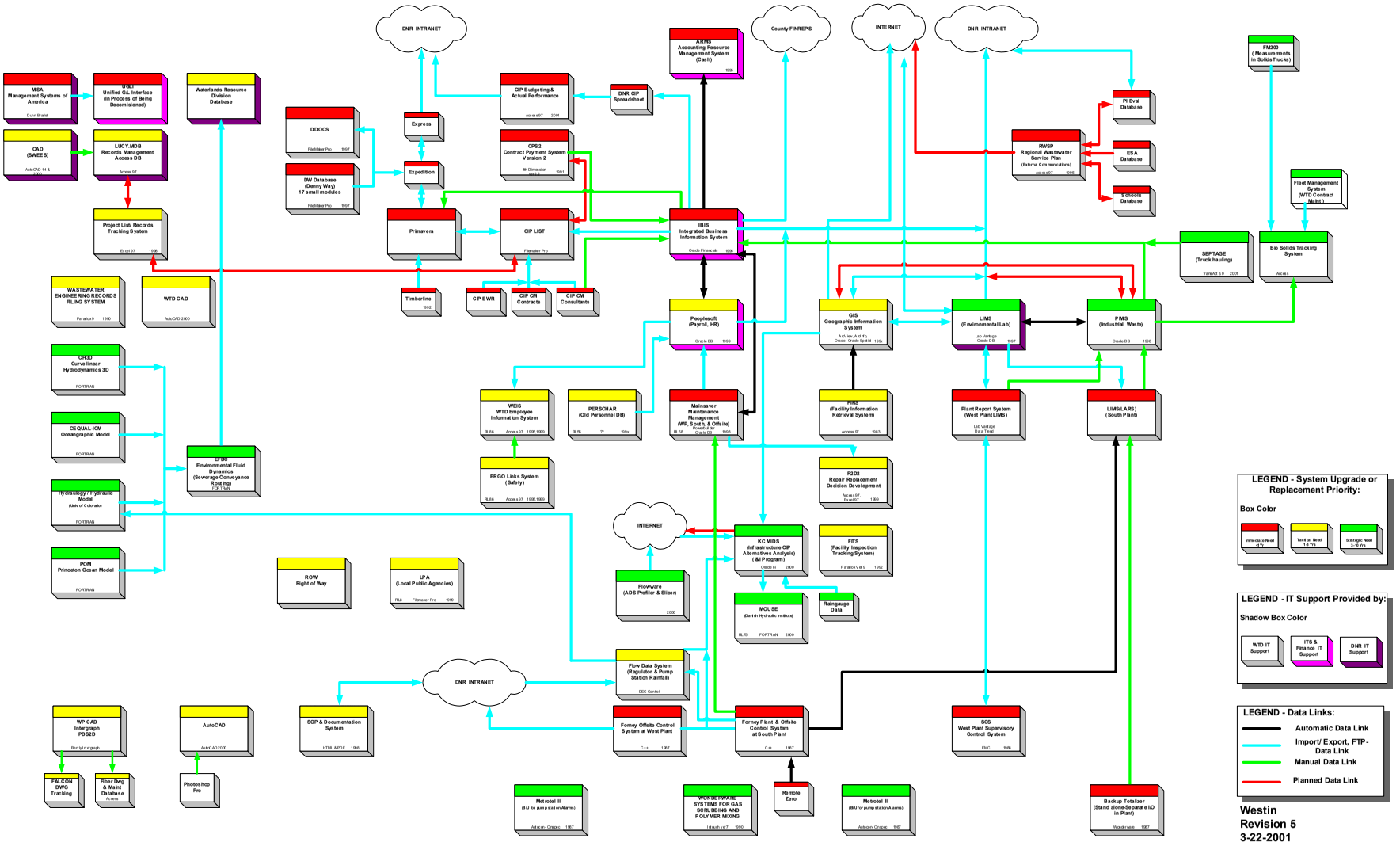

Figure E-1: Current Information System Interaction Diagram

1.5. Current Systems Relationship to Improvement Initiatives

As a result of conducting the need assessment workshops, and analyzing the needs that were developed in them, Westin reviewed the current systems and assigned them to one of nine Improvement Initiatives for further consideration in developing a set of Improvement Projects. The Improvement Initiatives are shown in Figure E-2. The current WTD systems are assigned as shown in Figure E-3: WTD Computer Systems Improvement Initiatives diagram and are color coded by improvement initiative.

Figure E-2: Improvement Initiatives

1.6. Master Plan Projects

The findings from this assessment were used in formulating the Improvement Initiatives, in the development of the Information Technology projects for the WTD that make up the Computer Systems Master Plan.

The IT projects that need to be implemented over the next ten years are documented in Appendix F. They consist of nine Replacement and New Projects, plus a number of Deferred projects that will be candidates for the next planning cycle three years from now.

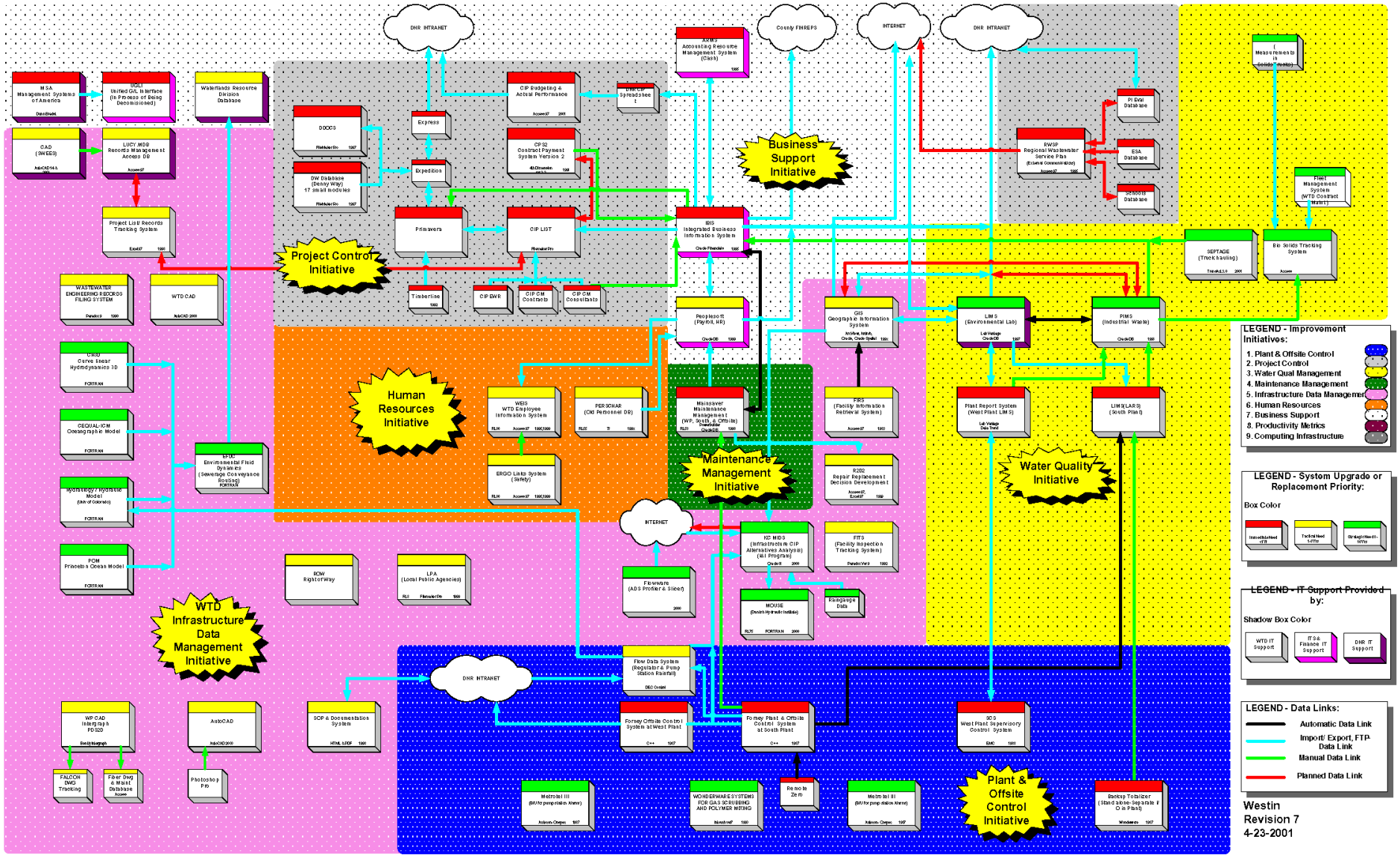

Figure E-3: WTD Computer Planning Study - Improvement Initiatives